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ABSTRACT

The proposed system for implementing new uses of telecommunication satellite technology is user-driven, addressing the needs of employed health personnel who would not otherwise have access to university resources, especially women, members of minority and disadvantaged groups, handicapped persons, and persons in rural areas. The plan, which builds upon the interactive capacity of the technology and its cost insensitivity to distance, is based upon a low-cost interactive audio and slow-scan video system utilizing ATS-1 or ATS-3, and designed to provide a transitional stage to meet current needs of user groups while preparing for crossover to utilization of a commercial satellite. Implementation would include establishment of an initial prototype network; expansion of the network to 13 ground stations located primarily in community health centers in several states; and possible cooperation and interface with the networks operated by the Appalachian Regional Commission and Department of Interior in the Pacific Trust territories to serve students in those areas. Initial programs include the University of Cincinnati external M.S. Program in Community Health Planning/Administration and a series of workshops and courses for health personnel. Appendices include supporting letters, status report of NASA experimental satellites, proposed receiving sites, and personnel vitae. (Author/CMV)

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A PLAN FOR APPLICATION OF TELECOMMUNICATIONS SATELLITES IN POSTSECONDARY EDUCATION

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NATIONAL INSTITUTE OF EDUCATION

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by the

PROGRAM IN COMMUNITY HEALTH PLANNING/ADMINISTRATION
COLLEGE OF COMMUNITY SERVICES
UNIVERSITY OF CINCINNATI

in cooperation with

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Director
Education and Training

and the

Public Interest Satellite
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March 31, 1978

IR000074

A PLAN FOR THE APPLICATION OF TELECOMMUNICATION SATELLITES IN POSTSECONDARY EDUCATION

Abstract

A plan for implementation of new uses of telecommunications satellite technology in postsecondary education is proposed.

The proposed system is user-driven, addressing the needs of employed health personnel who would not otherwise have access to university resources, with special emphasis on women, members of minority and disadvantaged groups, handicapped persons, and persons in rural areas.

The plan builds upon the interactive capacity of the technology and its cost insensitivity to distance. It is based upon a low-cost interactive audio and slow-scan video system, utilizing ATS-1 or ATS-3. It is designed to provide a transitional stage to meet current needs of user groups while preparing for crossover to utilization of a commercial satellite.

Implementation would include

1. establishment of an initial prototype network, or ProtoNet, of three ground stations in Cincinnati, Ohio, Washington, D.C., and Savannah, Georgia. ProtoNet will be operated by the University of Cincinnati in cooperation with the National Association of Community Health Centers and the Public Interest Satellite Association. Funds for a three-station interactive audio system have already been obtained.
2. expansion of the net to thirteen ground stations, located primarily in community health centers in several states.

3. possible cooperation and interface with the nets operated by the Appalachian Regional Commission and the Department of Interior in the Pacific Trust territories to serve students in those areas.

Initial educational services to be delivered to student/users include:

1. the University of Cincinnati external M.S. Program in Community Health Planning/Administration. This is an existing, operating program, developed under contract with the Bureau of Health Manpower, Health Resources Administration, DHEW. It would be enhanced and strengthened by the addition of an interactive telecommunications system. We believe this would be the first university degree program in the nation to be delivered with satellite technology.

2. a series of workshops and courses designed to meet continuing education and professional development needs of health personnel.

Other University of Cincinnati educational services to be delivered may include a baccalaureate program in health administration, a master's program in public administration, and a variety of continuing education courses. The Behavioral Sciences Laboratory of the University is considering use of the net for policy research. The net will also be made available to other user groups.

Experience gained through implementation of this plan will be shared with other colleges and universities and user groups.

USER NEEDS AND IDENTIFICATION

The pressing need for educational services in health planning/administration may be attributed to a variety of causes, but underlying all is the rapid rate of expansion of the health care sector. There has been a rise in public demand for equal access to quality, cost-effective care, and a new emphasis on prevention and planning and regulatory requirements as the result of new Federal and state legislation in recent years. The increasing pressure for more humanistic, more effective, and more efficient health care; for consumer participation in decisions affecting their health; and the move toward national health insurance place tremendous pressure on the policy-making and administrative structure of the industry. In turn, the need and demand for ongoing education of health planners and administrators has increased. In 1974, the Commission on Education for Health Administration estimated that about 75% of the 50-60,000 health administrators in the nation lacked a graduate degree in the field. The Bureau of Labor Statistics this year estimated that the nation will need 100,000 health administrators by 1985. New licensing and certification requirements now mandate degrees and annual continuing education for various kinds of health administrators.

Despite this situation, and complicating the existing education shortfall, is the fact that traditional university programs in health planning, hospital and health administration (seventy-seven are listed in the 1977 directory published by the Association of University Programs in Health Administration) are generally geared to a small enrollment (perhaps fifty to sixty students) of full-time, on-campus students. Further, these programs tend to concentrate in major cities, leaving gaps in large areas. Programs are listed in only thirty-one states.

In addition to problems of access to traditional on-campus programs, there are problems of cost, in terms of tuition and living expenses, loss of income from employment, uprooting and moving families and maintaining agency operations while employees are on full-time educational leave for a year or two. In many cases these costs are simply too high, especially for women and members of minority groups, employees of small health agencies, and persons in rural areas.

Despite these problems, university programs in health planning, hospital and health administration have more applicants than they can admit, and thus have little incentive to explore new ways of delivering educational services to new kinds of students. The University of Cincinnati Program is one of the very few in the nation which has developed a non-traditional education delivery mode.

Against this general background, the University of Cincinnati, in co-operation with the National Association of Community Health Centers undertook a detailed analysis of

potential student markets. The NACHC represents over 800 member centers in all fifty states and maintains, through its national Office of Education and Training, active files of requests for information on professional training and education. These files provided the basis for one of our approaches to the problem of specifying student/users and their educational needs.

A variety of criteria were used in assessing centers as potential ground station sites. One step in this approach was to correlate potential student/user groups with health centers capable of providing adequate physical facilities:

A. The physical plant was considered in terms of capacity to provide security for the ground equipment as well as a suitable room or rooms for student use

B. The level of student interest; the basic design calls for initial enrollment of at least 15-20 students at a site

C. The committment of management level personnel to co-operate in providing educational opportunities at their centers

D. The downstream potential for eventual cost sharing by a particular site

Centers were roughly sorted on the basis of the above through a questionnaire which was administered by NACHC's Director of Education and Training, Mrs. Annie K. Phillips. Several centers which met the criteria were then personally contracted and several letters of intent were secured (see Appendix A). This process was directed toward a clear demstration of student and site readiness in a broad geographic area. The method appears feasible and the sites proposed form the outline of a system which will serve areas which do not presently benefit from any such network. The proposed sites are a beginning and the network can be enlarged incrementally by continuing the process described above.

Our existing student population provided us with a second starting point and perspective on user needs and potential. All of those contacted (we focused on the near-to-graduating group) verified the high priority we have placed on interaction as the component which would most augment programs such as ours.

Several of our students are agency directors and stand ready to co-operate in terms of providing sites and cost sharing arrangements (see Appendix A). This enthusiam is based upon their having completed a substantial portion of our program in its present delivery mode which, while adequate, makes them keenly aware of the benefits that could be realized through an expanded interactive component.[1]

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[1] Design for E.T.V. Planning for Schools with Television. Educational Facilities Laboratories Inc. Revised Edition 1968.

On the basis of these discussions we have introduced the possibility of ground stations into negotiations with the Tennessee Hospital Association, Rio Grande Federation of Health Centers, and the Learners' Co-operative, all of which are interested in sponsoring or enrolling health professionals in our external degree program.

A third input to our user needs analysis was generated by the informational programming experiment which we conducted in cooperation with the Appalachian Education Satellite Program. This involved a one hour video presentation, on Monday evening, March 6, via the entire AESP network, describing our external degree program. A panel presentation was followed by a half-hour question and answer period in which potential students at each ground station could call in inquiries and comments to the participants. Panelists were:

A. Don Ostasiewski, co-director of the Program, who dealt with the history and structure of the Program

B. Annie K. Phillips, education and training director for the National Association of Community Health Centers, who provided the national level viewpoint on needs for continuing professional education

C. Dr. Martin Gerowitz, a Program faculty member, who gave a brief presentation on national trends in health planning as an example of our curriculum content

D. Ms. Pamela Tipton, who is currently enrolled, gave a student's perspective

Response during the feedback sequence was truly overwhelming and exceeded our capacity to answer during the allotted air time (forty-seven inquiries from sixteen sites were handled on the air and in a written format follow-up). In addition, we received twenty-two requests for applications at our Cincinnati office in the week following the broadcast. A formal evaluation of the experiment was conducted by A.E.S.P. Although the final results had not been officially released at the time of this writing, an early analysis was sufficiently positive to warrent our inclusion in the site co-ordinators' quarterly meeting which was chaired by Dr. Harold Morse[2]. The results of this experiment were gratifying:

A. Site co-ordinators indicated that our program attracted an audience different from that which they were accustomed to and that the audiences were attentive and enthusiastic

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[2]A preliminary evaluation and summary of findings produced by the field evaluation unit for the A.E.S.P. (Lexington) is included as appendix B.

B. This report is borne out by both the volume of questions during the broadcast and the written inquiries which we have since received

C. The aptness of the questions indicates to us that there is indeed a substantial market for health professional education in the A.E.S.P. coverage area which is typically rural and experiences the kinds of educational service gaps that we hope to address

D. Formal negoitations for delivery of educational services via A.E.S.P.'s A system is scheduled at this time

E. We have demonstrated that our faculty is capable of producing usable television mediated material

There was one additional activity which is related to analysis and identification of student/users. Early in the planning process we prepared an exhibit and shared the N.A.C.H.C. booth at the American Public Health Association convention in Washington in October, 1977.

The exhibit was informational in nature and featured a variety of courseware as well as N.A.S.A. satellite ground equipment. This was the first time we had ever taken our program into such a forum and the exposure was clearly a test of its appeal to such a population. We were well received by potential students and employers alike. We recorded names and locations at our booth and these data were fed into our site selection matrix when we later developed the site evaluation criteria. The breadth of interest was impressive and ran the gamut from offers of collaberative research through requests for applications from individuals.

The exhibit at A.P.H.A. was not designed as a recruiting effort although it did in fact generate applications. As a result of our exhibit, however, we did develop contacts with other organizations who use part or parts of the technology around which we were developing our educational plans. For example:

A. Swedish American Hospital of Rockford, Illinois, uses a slow scan t.v. net via phone lines to incorporate its clinics in rural areas into home hospital expertise

B. Trinity University of San Antonio, Texas utilizes a Darome bridge and offers certificate level courses on an intra-state audio net as in the Wisconson model[3]

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[3] A Design For Interactive Audio. Edited by Mavis Monson, Lorne Parker and Betsy Riccomini: University of Wisconsin Extension, April 1977

C. Northwestern University has done a series of experiments utilizing slow-scan techniques for the delivery of engineering courseware[4]

In summary, the combined outcomes of the activities which have been reported to this point show the following:

A. Our expectations concerning a nationwide need for on-site degree and continuing education in the health care sector have been verified

B. Response to our test programming combined with survey results validate the assumption that student/users can be clustered in an effective manner at the sites which we propose

C. Our marketing strategy has generated documented response in the form of student applications and letters of commitment from proposed sites

D. A workable site evaluation model has been developed and tested which can and will be applied to selection of future sites

E. Working relationships have been established with other systems which will augment our efforts in the future

An additional series of activities was undertaken during the planning phase which impact the area of user needs and identification. An advisory committee to this project was established at the University of Cincinnati, appointed by the Senior Vice President and Provost. The committee was organized largely at the Dean and department head level and was charged with providing input to our planning process in the following areas:

A. Issues of administration and support systems

B. Relating this project to the mission of the University, and helping to integrate this project with other University activities

C. Identifying research possibilities inherent in the project, particularly in Phase II

D. Determining interest of other academic units within the University in adapting this project to their own planning for serving new student markets in new ways. (Obviously, participation of other academic units in

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[4]Extending the Reach of the University with Narrow-Band Telecommunications: The Present and Potential Uses of Slow-Scan Televideo for Contnuing Off Campus Education. Stuart L. Meyer, Northwestern University. Octover 19, 1975....Paper commissioned by the Alfred P. Sloan Foundation.

a satellite system would make the system more cost effective)

E. Addressing the issue of academic quality in a non-traditional program

F. Reviewing and commenting on drafts of the Communications Technology Study and the User Market and Distribution Study and the final plan

G. Organizing post-planning follow-up activity as a prelude to implementation

A lively dialogue emerged and meetings were well attended. Most of the above issues were addressed, but from the standpoint of user needs, we feel that the cooperation which has been proposed between other departments and the proposed satellite project, are of most interest.

The Institute of Governmental Research under the direction of Dr. Peter A. Shocket offers the Masters of Public Administration and is developing an "in career " M.P.A. Program for external use. The Behavioral Sciences laboratory, under the direction of Dr. Alan Tuchfarber has also produced concrete ideas for participating in and enhancing the proposed system with additional user groups. The following are examples of the potential utilizations foreseen by Drs. Tuchfarber and Shocket:

A. UNIVERSITY OF CINCINNATI BEHAVIORAL SCIENCES LABORATORY: Telecommunications Satellite Technology As A Tool To Improve Social And Policy Research

At the heart of the research designs of many social and policy research projects are sample surveys. The reason for this is obvious, a sample survey is the only sensible method to obtain large scale, cross-sectional, representative data on the social phenomena or policy being evaluated.

It is probably accurate to describe the process that is used in conducting most social and policy surveys as follows:

1. The problem is identified

2. A research design is developed (including the sampling and interviewing methods)

3. The project director (or team) drawing on his personal experience and previous survey instruments used by other investigators, develops a questionnaire

4. A pretest is conducted; the design and/or questionnaire are modified accordingly

5. Field work is conducted

6. Data reduction, management, and processing take place

7. Data analysis and report writing (or publication) are completed

There is at least one fundamental weakness with this process, namely, the way the questionnaires are developed. Seldom is the project director a "typical" member of the population. Rather, the project director, like it or not, is usually a member of the upper middle class or the country's intellectual elite. Thus, when he drafts the questionnaire he is often doing so with a limited perspective on the problem being studied. This is true regardless of his expertise; evidence of this is our limited ability to completely explain any but the most trivial human behaviors. Interestingly the other major source of questionnaire items is survey instruments designed by other project directors with similar limitations. A pretest of the instrument clearly helps to improve it: however, what are we pretesting but a set of questions which have a set of biases and limitations already built in? Thus there is limited possibility for improvement as a result of the pretest.

We propose to conduct experiments using the capabilities of telecommunications satellite technology to identify techniques that would at least partially eliminate this problem. Here we rely on guidance that Paul Lazarsfeld gave the social science research community several decades ago, namely, before doing a large scale, cross-sectional survey, we should first use such techniques as focused group interviewing and in-depth, unstructured personal interviewing to identify the parameters of a problem. Then, using what has been learned, develop a formal, structured survey procedure to obtain data from a sample large enough to represent accurately the views of the population.

The technological capabilities inherent in the system being proposed as part of this overall project give us the opportunity to experiment with new ways of conducting social and policy research. For example, with interactive audio and video ground stations dispersed around the country we will be able to bring together a group of citizens at each station and conduct focused group or nominal group sessions with them discussing a given policy issue. From such discussions we would be in a much better position to construct a meaningful survey instrument than if we were to rely on our own "professional" judgement as to what the relevent dimensions of the issue are. This is just one example of how this new technology might be used in innovative and productive ways.

B. UNIVERSITY OF CINCINNATI INSTITUTE OF GOVERNMENTAL RESEARCH:
Satellite Teleconferencing Applications

The Institute of Governmental Research is keenly interested in your project from a number of different perspectives. We not only strongly endorse the idea conceptually, but feel that satellite teleconferencing would be a logical extension, both administratively and intellectually, to the work the Institute is currently doing. Before I detail the educational opportunities I see for us, let me briefly explain what the Institute does: What we want to do then may make more sense.

The Institute of Governmental Research is administratively tied to the Department of Political Science in the College of Arts and Sciences. All the people employed at the Institute hold an academic rank and teach in the Master of Public Affairs/ Administration program. The Director of the Institute is also in charge of In-Career Master of Public Affairs; a program for individuals currently working full-time in the public sector. The primary mission of the Institute is in the areas of applied research and training for federal, state and local governments. As part of that function the Institute sponsors and develops workshops/seminars for public officials -- elected and appointed -- on a variety of topical subjects.

Given this brief sketch of the Institute you can see why our interest and enthusiasm for your proposed project is so high.

The educational opportunities which we see, frankly, are enormous; let me detail just a few. Our In-Career MPA program could be translated either in whole or in part to the teleconferencing mode.

While this program is for those who hold baccalaureate degrees there is also a need to develop an Associate Degree program in Public Affairs/Administration for those who hold a high school diploma and work full-time in the public sector.

While each of the above programs are degree granting, there is a variant of each which would be amenable to teleconferencing.

For those who hold either advanced professional degrees or have a great deal of experience there might be a series of specialized programs, e.g., Advanced Public Management Techniques, which could be developed. Professional public administrators are in constant need of both specialized and broad-range courses based upon their current occupational position within a public bureaucracy. These could be done in the form of ad hoc

programs or a series of programs leading toward some form of certification.

Another group -- one we have worked with -- which could potentially profit from utilizing this form of communication are elected public officials especially those at the local levels. The rate of turnover is enormously high in those positions and there is a constant need for educational programs in this area.

While the emphasis has been on the professionals in the public service, there are many other possibilities for civic education through this type of programming. With the greater emphasis on public or citizen participation a whole series of programs could be developed to train individuals in skills attendant to better and more effective citizen participation.

On another level, public officials must deal constantly with a never-ending series of either routine or novel problems. The way solutions are developed to deal with these problems could be offered through this form of communication. In that sense, satellite teleconferencing could be conceived of as a vehicle for technology transfer both at the inter-state and intra-state levels.

The possibilities for utilizing this form of communication as it relates to public sector and citizenship training is both endless and exciting. An enormous amount of educational material has already been developed in this area which could readily be translated into this alterantive communication mode. We hope that we will be able to participate in this project with you and to that end offer our fullest support.

The important point in terms of user needs and identification lies in the fact that both the Behavioral Sciences Laboratory and the Institute of Governmental Research represent complimentary systems and new student consituencies. Both have proven track records and have strong potential for the generation of financial support. Informational and descriptive materials in these departments are enclosed in Appendix C.

Another area of interest for the user/needs analysis is the potential for educational services in the Pacific Trust Territory. Through our Public Interest Satellite Association subcontractor we were put in touch with Dr. Gordon Law, Special Assistant to the Secretary of the Department of Interior. Dr. Law is currently involved in the deployment of an ATS-1 interactive audio net in the Trust Territories. A high priority

for that system has been given to continuing education and health planning. Through serendipitous circumstance, we happen to have a student from the Saipan area enrolled in our residential M.S. program and through him we have communicated with Dr. Ronald Threat, the Chief of the Health Planning and resource development agency for the trust territory of the Pacific. Subsequent meetings with Dr. Law have resulted in an offer to provide us with a time slot in the Trust Territory system. If our resources permit, we expect to make an effort to identify potential user groups and to develop a response to their needs.

ALTERNATIVE APPROACHES

The problems of communication with a geographically disparate student body may be addressed with a variety of approaches. Over the course of our four-year involvement in non-residential education we have utilized print and audio materials distributed to students through the mail. This mode of distribution enables students to procede through the learning resource units at their own pace. It also allows students to arrange course sequences which serve their own educational needs, since the distribution medium (the mail) will accomodate different deliveries to different students. Additionally, students are made aware of the fact that they may call the faculty, collect, either for administrative or for content purposes. The students do spend an initial three days in Cincinnati at the beginning of their enrollment. During this time the Learning Plan is negotiated and finalized by students and faculty members working in an intensive series of face-to-face sessions. Students also attend quarterly cluster meetings which are held at locations which are chosen to minimize mean student travel time.

University of Cincinnati faculty members, along with other content experts are also in attendance at the cluster meetings. Most of the time during cluster meetings is applied to presentations and discussions dealing with specific areas of academic content. Administrative procedures such as course selection, registration, etc. are also dealt with. A powerful, albeit, latent function of the cluster meeting lies in the generation of peer group interaction. We feel that this is a vital element of graduate education in general and our program in particular. Meetings are designed to foster this process. The level of interaction which can occur through the medium of the cluster meeting is limited by the constraints of time. Meetings are held on weekends to minimize the loss of job time by students. Since some travel time is involved, both by students and faculty, the meetings cannot be held as often as would be necessary to optimize the interactive value.

This limitation led us to examine the use of other forms of communications in order to facilitate this interaction between students and faculty, and between students and other students.

Another drawback to our current cluster operation is that, because of travel time and expense, students are necessarily clustered by geographic area. Using other means of telecommunications would allow students to be clustered in a variety of other fashions such as:

- type of employer
- role within employing agency
- courses currently enrolled in
- special directed studies seminars
- shared interests or problems

It must be borne in mind that we propose an incremental approach to the application of higher forms of telecommunications to our program. Our existing Learning Resource Units, in the form of print and audio cassettes, are proven and effective. We will continue to use our existing Units, augmenting them initially with regularly scheduled teleconferences.

In making the transition from print and pre-recorded audio material to satellite communications it is important to look realistically at the capabilities of the technology. Over-utilization detracts from cost-effectiveness. At this stage, we believe that our needs can most effectively be met through narrow-band width satellite applications. The following factors are among the reasons for this conclusion:

1. narrow-band applications increase the number of available options for choice of spacecraft, e.g. ATS-1 and/or ATS-3 are viable options

2. there will be opportunities for exploring time-sharing with other users, including the possibility of "piggy backing" in the video guard band simultaneously with full-video users

3. in the event of operation with a commercial common carrier, lower transponder costs are possibly due to the use of less of the spacecraft's capacity

4. narrow-band applications lower equipment costs of earth stations and required support equipment

5. narrow-band applications increase the number of channels available for use, addressing the diversity of communications needs of the educational community

We propose a fully interactive narrow-band system utilizing audio, slow scan television and facsimile. We do not currently foresee the necessity for full motion video transmission with its 6 mhz bandwidth requirements. Our need is for a highly interactive system, and resources can best be applied toward this end, rather than the requirements necessary to an entertainment delivery system. We opt for a user driven system rather than one which must adapt itself to the requirements of a technology whose capacity exceeds our educational needs at this time. If greater capacity is needed, one can trade up...the reverse is rarely successful.

The first and most obvious alternative to consider in view of our requirements is, of course, the range of service options, available through the telephone companies.

THE TELEPHONE ALTERNATIVES

Three methods of telephone multi-point interactive connection were examined: The Bell System conference call, the Darome Teleconferencing Division conference call, and the use of AT&T long lines. Cost data for each was gathered for the proposed network. Comparisons were made on the basis of four hours of utilization per month (an absolutely minimal working estimate).

The Bell System Conference Call

Conference call rates are determined by Telco on the basis of an arcane formula involving the distance between the furthest points on the conference net and the number of points connected. The rate for our proposed thirteen site net is $66.50 for the first ten minutes and $5.50 for each additional minute. This yields a rate of $341.50 for the first hour. Succeeding hours on the same call would cost $330.00 each. For the purposes of this analysis the first hour rate has been applied. This would result in a cost of $1,366.00 per month, assuming four hours of use. Cincinnati Bell representatives have informed us that their technical limit for number of points in conference configuration is fifty-eight. They have cautioned us, though, that quality may degrade severely above twenty five.

Darome Teleconferencing Division

Many limitations of Bell System Conferencing capabilities have been recognized by industry and educators, and private firms have extended the market on response to these problems. Among these commercial services are those provided by Darome Teleconferencing Division. Darome provides, in addition to peripheral telephone hardware, a conference bridging (interconnection) service. Darome's system utilizes a "meet-me" bridge which considerably cuts down on the set-up time of the conference call. All parties call a central telephone number in Harvard, Illinois, where Darome interconnects, boosts signal level, and monitors quality on all lines. Darome charges $20.00 per hour for each line connected to the bridge. The long distance line charges are borne by the client. Darome will provide the use of their credit card for centralized billing for a flat rate of another $20.00 per hour. If this option is chosen, all calls are charged to Darome, which in turn bills the customer for a total of $40.00 per line per hour. This $20.00 per hour rate is in fact very close to the actual Bell billing rates for the thirteen site net to Harvard, Illinois. (The mean rate from the sites for the first hour is $20.74.) Additionally, there is a one-time "set-up" charge to the client of $300.00. The client is charged this fee only for the first time that the Darome system is used. This seems to resemble an initiation fee more than a genuine set-up charge.

Assuming amortization of the set-up charge over the first year's use, and the minimal use pattern of four hours per month, the hourly rate would be $526.25 and the figure for one month's use would be $2,105.00. The Darome system can currently bridge up to thirty-one lines. They anticipate forty-to-sixty line capability by June, 1978.

Darome presently provides service to Trinity University, which operates a non-residential undergraduate certificate program in Texas. We have provided consultation to Trinity about the feasibility of a graduate level program such as ours. We have been informed by the director of that program that recent price increases by Darome severly threatens the cost effectiveness of the system. The figures reported here reflect those increases

AT&T Long Lines

A third method of interconnection is the leasing of AT&T designated long lines. A long line net would provide a designated system available for twenty-four hour a day access. The pricing structure is somewhat different than the other two telephone conference options described. Bell sales representatives report to us that there are a variety of charges involved: installation, equipment rental and line use. For the proposed thirteen site net those changes are as follows:

installation	$ 703.95
equipment rental	$ 325.00/month
line use	$ 4,647.50/month

If the net is activated fewer than four times in a given month, the line use charge is prorated at 25% of the full rate for each use. For an application such as ours, it is clear that the net would be used at least four times in any given month, therefore, the full line use charge is applied. Again, assuming amortization of the installation charge over the first year's use, the total cost per month would be $5,031.16 for the first year. Assuming a four hour per month utilization pattern the hourly rate becomes $1,257.79.

While it is an informed hope that the costs of commercial satellite usage will fall in the future as both the technology and the market stabilize, no such hope exists for the costs of utilization of the Bell system. Cost alone is not a totally valid comparison criterion but a system, such as we propose, which has as one of its major objectives an increase in equality of educational opportunity, must consider the capacity of smaller isolated organizations and student groups to cope with cost factors as the system moves in the direction of full self-support.

SATELLITE ALTERNATIVES

Communications satellites are an intriguing alternative for our program. The three unique aspects of satellite communications which bring us to a careful examination of their potential are:

1. their capability simultaneously to access many points
2. their potential for fully interactive modes of operation
3. their cost insensitivity to distance

In examining existing options for use of satellites, however, we find ourselves in a peculiarly difficult point in history. On the one hand, the inevitability of the technology is inescapable. There is no question that the use of this new technology will increasingly become a part of the American educational system. Factors of changing student demographics, the demands and needs of "new learners," and rapid developments in the technology all point in this direction. If educators are eventually to have access to effective communication systems they must be a partner in their development. The opposing danger is that educators will be forced to do the best they can with a system which was designated without adequate consideration of their needs. Many of these crucial design questions still remain unanswered at this point. Engineering and policy questions remain regarding such areas as frequency and orbital assignments. These will not be resolved until the 1979 World Administrative Radio Conference (WARC). Another significant development in the technology, the large antenna, multi-beam satellite, awaits decisions on funding and NASA's priorities. The development of large antenna satellites would significantly reduce utilization costs and represents what could be an invaluable tool for educators.

These unresolved questions and possibilities make the task of planning for the educational applications of communications satellites difficult at best. It would be all too easy at this stage, to capitalize heavily a system which would be obsolete and highly cost-inefficient by tomorrow's standards. If educators are to impact successfully the development of this technology, and if the nation is to emerge with a useful, service-oriented, cost-efficient system of telecommunications for the non-profit sector's use, then it is critical, if not imperative, that educators gain hands-on experience now. It is only through such activity that the educational community will be able to determine what its true needs and capabilities are.

The choice of technology for experimentation should

consider well all of these factors. The option which represents the lowest capitalization and operating cost entry point, but which optimizes opportunities for direct hands-on experience, is most cost-efficient in the final analysis. Any technology chosen at present is at high risk of obsolescence within the next few years. This factor makes the argument for a low cost entry point imperative.

Commercial Satellites

Commercial common carriers must be viewed as the eventual means of transmission for a system such as we envision. However, the question of the appropriateness of currently available satellite carrier services must be addressed.

Commercial satellite carriers' present design configurations are adapted to a distributive mode. Inherent in this design is a very limited interactive capability. The system's main strength is the ability to transmit from one point to many points. The number of points from which transmission is possible, however, is low. Presently, commercial satellite carriers are simply unable to deliver the large scale interactive capability we require on a cost-effective basis. The limitation lies in the low number of uplink facilities presently on line.

Conversations with Western Unions' project manager for small aperture terminals, Mr. Donals Aisenbery, revealed additional problem areas. Our proposed sites do not match up well with Western Union uplinks and would require extensive telco interconnection. The cost effectiveness at this time is thus not promising. Much of this is attributable to current FCC limitations on the size of earth station antenna and to power flux density limitations which are intended to protect terrestrial services from interference.

The situation is far from resolved. Developments in the technology point to decreasing costs. The prospect of large antenna multi-beam satellites could herald extreme low costs for interactive communications.[1] Whether the necessary funds are to be allocated for this effort remains to be seen. Questions of frequency allocation and orbital assignment which will effect the future development of technology will not be resolved until the 1979 World Administrative Radio Conference (WARC). For these reasons it is a poor time to enter the commercial market.

The appropriate point in time for cutover to a commercial system depends largely on these and other unresolved technical and policy issues, as well as the dynamics of the market place.

One of the advantages of the narrow-band approach which

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[1] Horowitz, A. & Thomas, W. The unexplored option: Critical choices for public telecommunications, 1977-2000. New York: Public Interest Satellite Association, 1977, 28 pp.

we have adopted is the lower eventual least cost of commercial transponders.

One system which will bear close observation is the Advanced Westar/TDRSS. Scheduled for launch in 1980, the spacecraft will carry, among others, S Band (2.5GHz) transponders. S Band is currently allocated for educational service, and is utilized for instructional television fixed service (ITFS). If power flux density limits for S band are lifted this could represent an extremely cost-effective service. Discussions of this nature are currently taking place within the ITFS community. If the request for lifting of the power flux density limit came from the ITFS users, it is likely that it would meet with FCC approval, since the limits are for the protection of that service. The users of ITFS may make this move since many of them are also concerned with low cost educational satellite applications.

Another possible path for cutover will be the National Public Radio (NPR) satellite system, utilizing Westar. The system, still several years away, will have seventeen uplinks (including WGUC, owned and operated by the University of Cincinnati). While this may not serve the needs of students in all locations, it may represent a way to serve many, and such shared use may be judged to be a viable option. Many questions remain, however. The FCC would have to approve the appropriate changes on the earth station licenses, and the mechanisms and procedures for the sharing of the ground environment are yet to be determined.

The proposed plan would incorporate investigation of these and other options into the ongoing technical review and evaluation process, with an eye toward determining the appropriate point for commercial cutover.

EXPERIMENTAL SATELLITE OPTIONS

Four experimental communications satellites are currently operated by the National Aeronautics and Space Administration (NASA). They are made available to expermental users at no cost. The spacecraft are ATS-1, ATS-3, ATS-6, and CTS.[2]

Each was studied as to its applicability and cost-effectiveness for the delivery of educational services such as we envision.

The key elements of the analysis are:

1. interactive capability
2. cost of attendant ground hardware
3. prospects for compatibility in future systems
4. projected usable life time
5. footprint configuration

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[2] Status of NASA Experimental Satellites, a report by Dale Ogden, Director of Engineering, Public Service Satellite Consortium is attached as appendix D

ATS-1

ATS-1 is the oldest of the currently operative NASA experimental communications satellites. It operates in the VHF portion of the spectrum. It is capable of only narrow-band applications. It has been used successfully for fully interactive teleconferencing.[3] The costs of ground hardware for ATS-1 are extremely low. A simplex terminal, capable of two-way interactive operation can be procured for approximately $1,000.00 including cable and mounting hardware.[4]

The satellite, while over a decade old, continues to function without significant deterioration in performance. While it has far exceeded its initial projected lifetime, it is judged by NASA personnel that it will continue to be usable into the early 1980's.

The prospects of compatibility of ATS-1 ground equipment with future satellite systems are low. However, these must be costed against the very low price of ground hardware. The major caveat in the use of ATS-1 is the possible interference in urban areas from other VHF users and from signals generated by motor ignition systems. This is an unknown site-specific factor, which can only be determined by the placement of and experimentation with specific locations. This problem could necessitate relocation of sites within target cities, or even, new selection of sites. The interference problem was discussed with several experts and, although there was no consensus opinion, the variety of potential approaches seems to indicate that while problems do exist they are ultimately manageable.[5]

All but the extreme east coast of the continental United States are within the footprint of the space craft.

All technical considerations are identical for ATS-3, except that all of the continental U.S. is within its footprint.

ATS-6 has been used for a variety of experiments on health, education and telecommunications. Its strength, however, is as a broadcast distribution satellite, since it lacks interactive audio capability. The interactive component of ATS-6 experiments has been carried by ATS-1, ATS-3, or telephone circuits.

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[3] See for example: the Pan-Pacific Satellite experiment conducted by the National Education Association in 1976

[4] Our current bid dated January 15, 1978. Attached as appendix F

[5] Robert Fine, a consulting engineer, felt that minor modifications and shielding would suffice. Noflett Williams of AESP Lexington reported that moving of the antenna to a protected courtyard was adequate to eliminate interference.

The interactive use of ATS-6, therefore, necessarily entails the use of another route, either overload or through another satellite. For this reason, and because our interest lies in narrow-band applications, we view ATS-6 as an inappropriate delivery vehicle. Therefore ATS-6 was not pursued as a viable option.

CTS

CTS, the Communication Technology Satellite, is jointly owned and operated by the United States and Canada. Its two footprints each cover a portion of the continental United States roughly equivalent to a time zone. The footprints are movable to user specifications. The satellite can be used in interactive mode between the two footprints, but not easily within a single footprint. A completely interactive mode may be obtained by placing the two footprints over the same area. In this mode, however, the total coverage area of the satellite is reduced by half, to the area of one footprint. It is estimated that the cost of a CTS ground station which would meet our requirements is $15,000. We are informed by the Public Interest Satellite Association (PISA) that the prospects for compatibility of CTS ground equipment with future commercial satellite systems are poor. CTS is suffering from severe technical failures in its telemetry system, and its future operation is uncertain.

On the basis of the above, and in view of our educational mission we have selected ATS-3 as the most appropriate experimental spacecraft. Appendix D contains the "Status of NASA Experimental Satellites" which was prepared by Dale Ogden for the Public Service Satellite Consortium in October, 1977.

A number of options for shared use of existing systems were also investigated. These include:

The Veterans Administration
The Corporation for Public Broadcasting
The U.S. Department of Interior
The Appalachian Education Satellite System

The Veterans Administration

The V.A. is currently an experimenter in CTS. The VA sites were examined for proximity to locations where potential students for the UC program have been identified. A meeting was held with Robert Shamaskin, director of the V.A. project. Due to the recent inception of the experiment, Dr. Shamaskin informed us that the V.A. had not yet developed policies and protocols for shared use of their system with other users. The possibility for cooperation at a later point in time remains open.

The Corporation for Public Broadcasting

The Public Broadcasting Service (PBS) is in the process of transferring its network distribution system from AT&T terrestrial service to Westar, Western Union's communication satellite. National Public Radio (NPR) will also be making the cutover to Westar, though that transition is not scheduled to begin until 1979. The Corporation has expressed a willingness to explore possible sharing of the ground environment with other users. A representative of the University of Cincinnati attended a conference with representatives of CPB and other potential user groups to discuss possible shared use of the system. The conference was convened by the Public Interest Satellite Association (PISA).

The CPB satellite systems (PBS and NPR) have been designed to replace their existing nets, and thus have been conceived as distribution systems. Their interactive potential is limited. The PBS system will have only six uplink facilities. The NPR system will be more highly interactive, with seventeen uplinks including WGUC which is owned and operated by the University of Cincinnati. However, NPR's progress is at least a year behind the television system development.

Despite these limitations, there is potential for cooperation with the PBS and NPR. The specifics of any such arrangement, though, are premature. Such a relationship would first require a modification of these systems' earth station licenses by the FCC. Shared use of the ground environment, and the leasing of additional transponder space from Westar may very well become a viable future option, but it is too early to finalize any such plans.

The U.S. Department of Interior

The U.S. Department of Interior is in the process of deploying an ATS-1 system in the Pacific Trust Territory and the newly formed Commonwealth of the Northern Mariannas Islands. Following discussions with Dr. Gordon Law, Special Assistant to the Secretary of Interior, we have been offered access to their system in order to make our graduate program available in the Pacific Trust. This would be impossible under our current mail distribution and cluster meeting procedure. Mail service in the Pacific Trust is erratic at best, and travel costs for faculty to attend cluster meetings would be prohibitive. We will continue to pursue this opportunity.

Appalachian Education Satellite System

The Appalachian Education Satellite System (AESP) is an extensive satellite delivery system with sites throughout Appalachia (See appendix E) AESP sites). The AESP utilizes ATS-6 for distribution. The central television production

facilities and ATS-6 uplink are located on the campus of the University of Kentucky, at Lexington. It should be noted that Lexington is only 100 miles from Cincinnati, a factor which should be considered in terms of possible future shared use. At this time the AESP system is moving to fully interactive audio capability. All sites have been equipped with ATS-3 ground equipment, which will shortly be tested and put into full operation.

The AESP offered us the opportunity to conduct an experimental program on their system. The primary purpose of the broadcast, which occurred on March 6, 1978, was as a part of our user identification study. It is discussed fully in that section of this report. The success of the broadcast indicates that future cooperation between AESP and UC holds great promise. The new capability of the AESP system for full audio interaction meets our requirements. At this time we have begun discussions with the AESP to negotiate the form of future cooperation. Options under consideration include the use of AESP site ATS-3 ground equipment. It would be possible for us to conduct teleconferences from Cincinnati utilizing our own ATS-3 terminal. This could be made very cost effective by utilizing ATS-3 at the same time that other AESP programs are being distributed over ATS-6. This would minimize the extra staff time required at the sites, and lower the overhead costs of each of the separate broadcast modalities. Also under consideration are periodic video seminars and workshops, which could also include interactive segments. Such broadcasts could be aimed not only at our students, but also at a larger audience on a continuing education basis. Discussions with AESP staff members have indicated that the types of programming which we have the content expertise to develop are areas which their own research has determined to be needed in their service area. At this time cooperative endeavors with the AESP have not been formalized, but discussions are scheduled for early April. All indications are that the prospects for a mutually beneficial relationship with the AESP are excellent.

It bears repeating that technical decisions must be made against a very quickly changing background and that questions far outnumber certainties. Issues of instant obsolescence and future non-compatibility of systems are of sufficient magnitude that low capitalization outlay appears particularly prudent. Our investigations thus lead us to the conclusion that the technology of choice for our applications is ATS-3 or its equivalent.

The services to be delivered via satellite will have as a nucleus the masters level curriculum in health planning/ administration which the University of Cincinnati currently offers through our external degree option. A variety of additional and complementary educational services will be presented as the elements of an incremental growth paradigm. The procedures and strategy for the deployment, evaluation and possible modification of these components as well as their required support systems will be discussed in this section. Because the satellite delivery system which we propose is firmly based upon an existing educational offering, it is appropriate that a detailed description of that program be provided here.

University of Cincinnati Experience

1. Overview

In July, 1974 the University of Cincinnati began to develop an external master's degree program in health planning/administration with seed money provided by contract No. N01-MB-44178 Bureau of Health Manpower, Health Resources Administration, DHEW.

Now, after more than three years of implementation, the program has assumed a reality that is different from and greater than anything we anticipated, a reality that is somewhat awesome in its potential for impact on community health and on health and medical care services.

The program is based on the concept of individualized, self-paced, student-directed learning to achieve competency goals. It is designed for persons already working or involved in the community health system, with special emphasis on those who might not otherwise have access to graduate education.

Students are generally enrolled in "clusters" of persons within a geographic area such as a state, who are able to meet periodically, generally at least once each quarter for two days.

Students, in cooperation with faculty, design individualized programs of study to meet competency goals and may utilize a variety of learning opportunities and experiences to achieve their goals, including: Learning Resource Units provided by the University of Cincinnati, courses at other universities, tutorials, and apprenticeships.

The student is expected to complete sixty quarter credit hours of graduate study, including a thirty-six credit core, fourteen credits in electives, a nine-credit Comprehensive Action Project, and one credit for Learning Plan Design. Core areas include applied planning theory, applied administrative theory, health care systems, consumer advocacy and ethical issues, fundamentals of health and disease, and data management.

Through the Comprehensive Action Project the student is expected to demonstrate his or her ability to bring about significant action to improve community health and/or to improve the delivery of health or medical care services.

Students enter the program with an on-campus session, during which they meet faculty and other students, design their learning plans, identify resources they need, and begin work.

2. Learning Resource Units

Learning Resource Units are a key element of the program. Learning Resource Units are not programmed courses; they are not correspondence courses. In a student-centered program, they are creative resources designed to help autonomous professionals who are on the firing line to attain specified competency objectives. They vary in format, but generally contain a study guide, readings, references, lectures or discussions on audio cassettes, and exercises designed to help the student use his or her community and work setting as learning resources. In a sense, they are technical assistance manuals, designed to help professionals function as masters of a body of knowledge, with faculty serving as consultants. Thus students, through the process of applying theory and skills presented in the Units, can have immediate impact on the analysis of health problems and services and on decision-making in their agencies and in their communities.

Units are now available on a range of topics. For example, a series on data-based health planning covers the census, population descriptors, migration and mobility, vital statistics, morbidity, and the life table. Another series, on community health estimates, deals with various aspects of epidemiology. Other units are available on concepts of community, concepts of health, health economics, program evaluation, systems theory and quantative systems analysis, management theory, planning for acute medical care services, ethical issues, and consumer advocacy.

Within the University, Learning Resource Units are listed as courses. They have course numbers; they offer specified numbers of credits; students register for them as they would for courses. This procedure accommodates our approach to the University's administrative system; we have not demanded that the system make radical changes to accommodate us. As a result we have avoided unnecessary and unproductive conflicts in introducing a non-traditional program.

3. Quality

To assure and protect the quality of the program, we follow a variety of procedures. For example:

a. The external degree program has been integrated with our on-campus graduate program. Students in both programs must satisfy the same degree requirements; both programs draw upon

the same faculty.

b. Our program is competency-based, and therefore emphasizes knowledge and behavior or performance which the student must demonstrate in order to earn credit and to graduate.

c. All new Learning Resource Units must be approved by our own faculty, and then by the Curriculum Committee of the College of Community Services, just as all courses must be approved. Unlike many traditional courses, in which syllabi and reading lists provide an inaccurate picture of what is actually taught, the Learning Resource Units provide visible and tangible evidence of what the student is exposed to and what the student is expected to accomplish.

d. We gear our Learning Resource Units to the Carnegie unit for establishing course credits, that is, one hour of credit requires thirty hours of contact and preparation by the student. We have found that students work an average of 38.3 hours for every hour of credit they earn through our Learning Resource Units.

e. We have built in an evaluation system which regularly brings us feedback from students on the Learning Resource Units and on the program generally. Feedback is also obtained from supervisors and employers. Students report that the Units, which are concise and organized around performance objectives, are more demanding than most university courses, where time is often wasted on extraeous matters.

Thus the University of Cincinnati has experience in developing software, and has in fact developed software which can be readily adapted for use with satellite technology.

4. Costs and Benefits to Student/Users

It is difficult to estimate what the actual costs of operating a program such as ours will be. Many of the expenses incurred during the past three years were developmental, and would not be repeated. A better picture should be available a few years from now. Yet several important factors in any cost assessment are already quite apparent:

a. Students remain in their jobs and continue to be productive; the employer is not faced with the problem of finding temporary replacements for a year or more.

b. Students do not require traineeship support, either from their employers or from Federal sources.

c. Because students can maintain their incomes, many can afford such expenses as part-time tuition, books, and travel. However, in many cases their employers or other agencies have been willing to assume or subsidize these costs, as in the case of the Ohio and Tennessee state health departments.

d. Because students remain in their jobs and are often in positions of influence, they can apply what they are learning almost immediately, hopefully with immediate benefits to their communities. The time lag in application of new knowledge may be significantly reduced.

e. The interaction between faculty and students who are employed in positions of influence produces another cost/benefit relationship. The questions asked of faculty result in a form of free consultation or technical assistance to the agency. Obviously, this interaction creates costs for the University and demands upon the faculty, but the benefits far exceed the costs.

f. Students and their employers provide a very important source of continuing input on what is happening in the health world, and what are the competency needs of health planners and health administrators. This gives the Program valuable information for use in faculty development, curriculum development, and research design.

Obviously the benefits cited above would be maintained, and should be increased in a program utilizing satellite technology.

5. Administrative and Support Systems

We have learned that administration of an external degree program is vital to the success of the program. While we have adapted to the existing system where possible, for example by listing our Learning Resource Units as courses in the University computer, some changes have been made in cooperation with University officials.

The University support system -- such as libraries, bookstore, registrar -- which quietly and routinely serves on-campus students and which we take for granted, is not equally accessible to off-campus students. Thus we have found it necessary to monitor the various contacts students may have with University units, such as the registrar, the bursar, and the bookstore, to assure that student needs are being met. It has been necessary for us to make arrangements with the University bookstore to handle mail orders. It has been necessary for us to intercede with other University units in regard to errors in student fees, or errors in computer printouts. In effect, our cluster managers for the Ohio and Tennesses student clusters must act as ombudsmen for their students.

We have learned that we must be concerned with timing. For example, on-campus students receive a course syllabus at the first session of a course, and are generally able to purchase books or find materials in the University libraries almost immediately. Off-campus students must be sent a list of references they will need at the time they register, so that they can begin the process of book purchasing and searching at local libraries several weeks before the Quarter begins. Otherwise they fall behind schedule vary quickly.

Library resources appear to be a problem. We have found that students often do not know how to use libraries. Also, while they have ready access to local public or college and university libraries, such institutions do not often have some of the specialized references required by our Learning Resource Units. Inter-library loans are possible, but time-consuming. We are addressing this situation several ways:

a. A non-credit Learning Resource Unit on library use has been prepared to assist students.

b. Authors of Learning Resource Units are asked to keep the library problem in mind in selecting texts and readings.

c. We will explore the possibility of establishing a lending library for off-campus students.

6. Interaction

While students work independently to implement their individualized learning plans, and communicate with faculty via telephone as questions arise, it has become apparent that greater interaction among students and faculty is both desirable and essential. Informal interaction has evolved, for example, with students in a geographic area taking the initiative to organize meetings among themselves. A formal mechanism has been implemented, in the form of cluster meetings which are held once or twice each quarter.

Clusters now in operation include the Ohio cluster, the Tennessee cluster, and the "free" cluster (students in Indiana, Kentucky, West Virginia, Pennsylvania, Minnesota, Arkansas, and other states). Each cluster is managed by a faculty-secretary team. The cluster managers organize cluster meetings to provide for seminars and lectures to supplement or complement material in the Learning Resource Units, to cover material not available in Units, and to stimulate interaction among faculty and students. Time is also provided for individual student advising, and for feedback and input from students in regard to any aspect of the program.

The number of cluster meetings held is limited by travel time and costs.

Communications technology could make possible cluster meetings via satellite, probably with greater frequency and greater student participation. Addition of new student clusters located at greater distances from Cincinnati would be possible. For example, four health professionals in the Mariana Islands have requested admission to the Cincinnati program; satellite communications might enable us to serve such isolated students; there are many in the United States.

7. Other findings

a. We expected a great deal of interest from prospective students, and this has happened. We have not advertised or marketed the program, except for limited testing purposes, but we receive a constant stream of calls and letters from individuals who have somehow heard about it. What has been surprising is the interest of agencies and organizations which wish to contract for educational services for staff or other health professionals. Such contracts have been worked out with the state health departments in Tennessee and Ohio; others are under discussion. Evidently there is both a need and a market.

b. Response to the program by students and their employers has been almost uniformly positive and enthusiastic. Students tell us that:

(1) They could not go to graduate school if a program such as ours were not available. They cannot leave their jobs to enroll in traditional on-campus programs.

(2) The goal of attainment of a graduate degree, or credential, is an important motivating force for students. They are not merely interested in continuing education courses.

(3) Avoidance of the competition that exists among students in a traditional campus setting is a positive factor. In our program, students compete against themselves.

(4) They now feel more competent, more effective, more professional in their jobs.

(5) They are generally satisfied with the Learning Resource Units they have used. They consider the Units to be rigorous and immediately useful in terms of dealing with problems they face in their jobs.

c. We have found considerable interest among other universities. Several have visited Cincinnati or met with us elsewhere to discuss purchase or lease or franchise of our Learning Resource Units, or development of faculty sharing arrangements or development of consortia. Some interesting new forms of cooperation with other universities are a definite possibility. There is also a major possibility for impact on higher education generally.

d. The extent of nationwide interest in the program is indicated by the number of presentations made during the past year alone, before such organizations as the American Association for Higher Education, the Association of University Programs in Health Administration, and the American Public Health Association,

and at the Trinity University Conference on Continuing Education in Health Administration, and the Bureau of Health Manpower Workshop on Role Delineation, Curriculum Relevancy and Training Modalites for Health Services Administrators.

8. Readiness

The opportunity to participate in the planning and implementation of an innovative educational venture such as that outlined by the National Institute of Education (RFP NIE-R-77-0012), comes at a particularly appropriate time in the evolution of our program.

The University of Cincinnati

- offers the largest external degree program in health planning/administration in the United States. Some 200 students in several states will be enrolled by the Autumn Quarter, 1977

- has experience in developing software, and has software on line which can readily be adapted for use with satellite technology

- has experience in developing new sources of funding, for example, training contracts with the Ohio and Tennessee state departments of health.

In a sense, the University of Cincinnati program, because of its conceptualization, its design, its software, and its goals, and its accomplishments, is a program which is simply awaiting the advent of appropriate communications technology to enable it to achieve its full potential.

The initial application of satellite technology to the masters level program will be focused upon the interactive potential of the system. Teleconferencing between faculty and students and the facilitation of contacts between student groups will address several issues inherent in a program such as ours:

a. The learning resource units are guides to self-study and refer students to a variety of community based learning settings and data sources. These resources are differentially available and their quality varies from our community to another. Through teleconferencing, high quality resources could be shared.

b. While the highly motivated (or experienced) independent learner finds the Learning Resource Unit a sufficient basis for the development of the specified skills and knowledge which must be demonstrated for the student performance evaluation, our research to date indicates that many students feel that they would benefit from increased contact with program faculty. This additional contact may gain salience as the outreach potential of satellite communications enables us to provide educational

opportunities to learners whose entry qualifications may be more varied than those who are currently enrolled.

c. Peer group interaction is the hub of professional socialization and may represent the single greatest deficiency or trade off that must be faced by independent learners. It is the addition of the interactive capability to our program deliverables that is at the heart of the plan that is proposed.

The evolution of our current educational design for delivering our external M.S. in Health Planning/Administration has given us a good deal of information about what can and cannot be done in an external degree program. Our original idea was that no student would ever have to leave his/her cluster area but would be sufficiently motivated to do the necessary work without direct contact with the faculty or other students. It did not take long to realize that some students would need both kinds of interpersonal contact if they were to finish the program. Even with these contacts, the immediacy of their education is not sufficient motivation when faced with competition from job, family and other pressures.

Even with cluster meetings once a quarter, students still relate that they do not feel like students. With all the pressing problems they face, school work is what is postponed when they run out of time. Cluster meetings force them to confront their own progress or lack of it, but, with infrequent meetings, the periods of accountability are few and far between. When even these periods become too painful, they are easy to avoid. The reality of driving long distances to a cluster meeting, or of taking two days out of a busy schedule are handy excuses for less motivated students. Unfortunately, the majority of those who stop attending cluster meetings also stop taking course work. Another problem students express with the current program is the fact that once a quarter is not frequent enought to ask questions. Although we encourage toll-free telephone calls, not all do it. This means that direct contact with the program is limited to four times a year -- if they attend cluster meetings.

Finally, cluster meetings are not long enought to do all that needs to be done. Time pressures dictate that they begin no sooner than Friday afternoon and end no later than Sunday noon. Students must bear the expenses of a room for two nights and meals for that period. Even with this time it is difficult to develop the feelings of belonging, give some new input about the field, discuss current Units and answer questions, talk about new developments in the Program, and deal with their problems and general questions.

In designing the educational format to use satellite transmission as a part of the educational delivery system of the External Program in Community Health Planning/Administration, we will conceptualize this system as complete in itself. That is, we assume that students who have access to a ground station will not have to come to the U.C. campus or attend meetings other than those at the ground station. Units will be mailed to students and students will mail back the Student Performance Evaluation (SPE) and, of course, there is the potential for two-way communication by telephone and mail. This may or may not be the best approach but it will be the most basic situation and can be modified by whatever else is thought to be of value.

The most expedient way to planning the educational programming is an incremental approach which would increase the offerings as our audience increased. In this way we will gain in both skill, knowledge and support of our current endeavors before venturing into the next phase.

Start Up

Initially, educational programming will be directed toward the degree students. The key to their participation is the ground station and all students admitted to the program under this option must have both access to a ground station station and be willing to commit themselves to attending a meeting there at least once a month. Since attendance is mandatory, students who would not or could not make such an agreement would not be admitted to the Program. Students who failed to honor this agreement would, after a given number of missed meetings be dropped.

This strict requirement is necessary to minimize student attrition. This design will create a cohesive group at each ground station. The students at each ground station will be responsible to each other. To stimulate this, U.C. will keep records by, and refer on the air to, the records of each ground station. Ground station groups will be given tasks to solve and will report back results on the air. Through these and other devices, the ground station group will become a cohesive unit. Its members will be known by the group to which they belong. This group identity will produce several beneficial effects. One will be the creation of a situation sharing characteristics with class attendance. There will be other students, an instructor who will answer questions, the ability to compare progress assignments, and a monthly reminder of task and due date. As a part of the process of group identify formation, it is hoped that intra-group communication (both scholastic and professional) will be maintained in the periods between formal ground station meetings. In addition, one

person would need to be hired for each ground station to be sure that the system was working, take attendance, distribute material and collect any program evaluations we might want.

Learning Plan Design and Orientation

The Learning Plan Design and Orientation (LPD&O) is designed to initiate the student into the Program. As such, it is conducted after students have been admitted to the Program, but before they select the Units they will take during the initial quarter. The four objectives of the LPD&O are:

A. to have students complete their Learning Plan by selecting Units which will fulfill both their degree requirements and their own career needs

B. to increase understanding about the Program and its requirements

C. to meet the faculty and staff ot the Program and

D. to get to know other entering students

The LPD&O will take place on five consecutive evenings (or on one evening a week for five weeks) with each transmission lasting two hours. All incoming students will be advised well in advance and required to attend all sessions. Prior to the first transmission, each new student will be sent Part I of the LPD to complete before the first session. They will also receive instructions on where the ground station is and information about others who will be in their ground station group.

Each ground station teaching assistant will be sent a notebook for each student in that group to be distributed the first night of the LPD&O. The notebook will contain:

Part II of the LPD
List of Units available
LPD Supplement with forms and instructions
Comprehensive Action Project guidelines
Resource Guide
Several rule and policy statements

On the night of the first LPD&O session, students will be expected to arrive one hour before the transmission begins. That time will be spent in a structured exercise designed to acquaint students with each other. On the remaining nights, students will be asked to arrive one half hour before the transmission to review progress, formulate questions, indicate expectations and deal with one another's concerns. After each transmission, students will be asked to complete an evaluation of that session.

The general agenda for the five sessions will be:

Session One-LPD

Interpersonal Activity - Pre-transmission
Pass out material - Pre-transmission
Begin interactive transmission
Welcome new students
History of Program
Overview of LPD&O
Educational Delivery System described
Rules and Regulations of Program
Introduction to Learning Plan
Elective Opportunities
Advanced Standing Resultations
Questions from students
Meet students in other ground stations exercise
Sign-off
Evaluation - Post-transmission

Session Two-LPD

Interpersonal Activity - Pre-transmission
Interactive transmission
Rules and Regulations of Program (continued)
Meet Faculty
Learn about Units in two Core Areas
Discussion on Resource Unit in Notebook
Input - A 20 minute lecture on a current topic or problem in the health field by an authority
Question from students
Sign-off
Evaluation - Post-transmission

Session Three-LPD

Interpersonal Activity-Pre-transmission
Interactive transmission
Meet the faculty
Learn about Units in Two Core Areas
Begin Part II - Part of LPD Unit selection
CAP Explanation
Questions from students
Sign-off
Evaluation - Post-transmission

Session Four-LPD

Interpersonal Activity - Pre-transmission
Interactive transmission
Meet the Faculty
Learn about Units in Final Areas
Panel Discussion of Current Students with Questions from new students

Sign-off
Evaluation - Post-transmission

Session Five-LPD

Open work Session - here students will work on their Learning Plan at the ground stations. All U.C. faculty will be available to answer questions about their area of responsibility. Questions asked will be answered to all groups.
Instructions for Registration for Quarter
Questions in general
Closing
Sign-off
Evaluation - Post-transmission

Ground Station Meetings

The key to having educationally beneficial ground station meetings is program design. Because of face-to-face relationships, other chances to meet and talk, and frequency of meetings, the classroom faculty has a great advantage over the faculty member leading these meetings. As a result, planning must be done to make optimal use of the potential of this medium. The length of each learning segment, the type of presentation, the structure of the presentation and the interactive devices used must be carefully considered. Breaks or periods of activity which do not require attention to the transmission should be planned at least every hour.

The advantage of this system over a one-way system is that students can interact with the speaker and with each other. Since active participation is a positive educational device, it must be used whenever possible. Past efforts at encouraging interaction has shown that it will seldome come without planning. As many interactive devices as appropriate should be used to insure maximum student participation.

Several interaction devices which might be used are:

a) asking questions for anyone who might want to answer

b) asking questions of someone at a particular ground station

c) asking a question and giving each ground station five minutes to get concensus on an answer

d) giving a case study and asking each ground station to discuss the case and decide on a course of action.

e) after a lecture or other input session, give each ground station ten minutes for a "buzz-group" to discuss the input and decide what questions they want to ask

f) ask for report by a particular student at a ground station on something he/she did which might be of interest to other students

g) interview a particular student about something of interest to other students

h) after some advance preparation, conduct a panel discussion using students at various ground stations

i) do brain storming sessions to obtain answers to problems of concern to all students.

Because one can never count on an interactive session going smoothly, one should always have some ways to get and keep such interaction going. Ways to do that might be:

a) ask direct questions of a person or a ground station group

b) assign problem-solving activities and ask for a verbal report

c) ask if any people have had experience with a particular topic.

Another device which will help interaction is to provide a roster of participants to all students. Such a roster might be organized according to stations and contain information on each student there, such as name, occupation, interests, hobbies, address, home and work telephone number, and perhaps the units in which the student is enrolled. Students throughout the network could then begin to associate a voice with some of its owner's interests.

Students would be asked to gather at their ground station once a month at least forty-five minutes before the transmission begins. During that time they would:

a) discuss where each one is as far as completing the Units for which he/she is enrolled

b) discuss any problems they were having with the Units and help each other as much as possible

c) decide on questions they want to ask

d) discuss any job-related problems to see if others in their group can help them

e) discuss the agenda for the transmission scheduled for that evening sharing the kinds of things they would like to learn from it

While the format for each transmission would vary, they would probably be composed of items such as:

a) discussion of the Units being taken that quarter by the faculty in charge of the areas represented. This should include goals of the Units and an explanation and/or example of an appropriate Student Performance Evaluation. It will also include answering questions students have about the Units and dealing with any problems they are experiencing.

b) news from the Program. Announcements about any changes in the rules and regulations, helpful suggestions, announcements about happenings to members of the network and other items of interest

c) a role call of ground stations for news or comments they might want to pass along

d) a progress review by ground stations (not by student name) about completed units

e) announcement of approved CAP projects and the name of the students involved

f) requests for help on specific health related problems that other ground station members may have had experience with

g) general question time

h) a description and discussion of Units to be offered the following quarters

i) input. This might take a number of forms:

(1) a lecture by a member of the faculty
(2) a panel or speaker on health-related problems or administration
(3) an analysis of current health legislation
(4) lectures by faculty from other departments at U.C.
(5) student reports or contributions
(6) an analysis of a student's CAP project
(7) discussion of current issues in health

Whenever possible, it is suggested that pre-produced and/or generated visuals be used. In fact, a bit of planning will enable faculty to utilize the video portion to good advantage.

After each session, an evaluation should be done of that program to see if:

a) students' expectations are being met

b) students still have unresolved problems

c) the technical quality of the transmission is satisfactory

d) how the learning situation compares to a standard classroom

e) other

It will be appropriate to continue our initial degree-based program phase until there are sufficiently large numbers of ground station groups. Given the probability of limited resources, our time and effort should first go into building a high quality, employed student-oriented degree program which will both attract new degree-seeking students and build the Program's track record as a provider of quality education. If our students are satisfied with the Program and if there are a sufficient number of them, our reputation will spread in those areas where we have ground stations. The size and quality of our impact in those areas will determine when we should best begin our next phase.

Our first activity will be the telecasting of mini-courses and workshops on topics which represent the expertise of Program faculty. Our existing students may elect to enroll in them for credit in addition to their work on units. We will use the same basic model as we use for mini-courses in the current program. However, instead of having the mini-courses over a weekend, they would be one night a week for several weeks. Satisfactory completion of a mini-course would yield one hour of graduate credit. The interactive capacity of the system could be used to good advantage.

While these telecasts would have the effect of supplementing curriculum for our students, they also serve as the first step in our continuing education plan. Within those areas served by our ground stations, we will advertise our mini-courses as being open to the community. Students enrolled this way would either earn graduate or CEU credit. Our current students could talk to their fellow employees to spread the word and even extend personal invitations. This initial recruitment method has been successful among our existing students and should be appropriate to our new delivery mode.

The workshop telecasts will be scheduled on a different night than cluster meetings. The mixing of Program students and continuing education students should be helpful to both. First, it would be expected that Program students would welcome the continuing education students as both guests and co-participators. Second, Program students would already be familiar with the system and act as models during the interaction. Third, it would bring together members of the community in an interactive learning situation which should help all to relate more effectively in their daily jobs.

The frequency of these kinds of mini-courses would be determined by the level of interest but the plan would call for offering increasing numbers of such courses. After some

experience with health related programming, the offerings will be expanded into areas which hold interest for persons outside of the health field. As the programming areas broadened, advertising would be broadened to focus on other populations within the ground station areas. We will use the facilities of the other U.C. departments as we offered mini-courses which were of interest to both professionals and people in other areas. It is at this point that we forsee increasing network utilization by the Institute for Governmental Research and the Behavioral Sciences Laboratory. Several of the workshops and mini-course series are presently in our on-shelf courseware inventory. The format for these more general continuing education offerings will be a tele-lecture combined with an interactive teleconference segment similar to the design which we utilized in our A.E.S.P. experiment. A brief description of several of these workshops and mini-courses follows.

WORKSHOP SERIES ON GRANTS AND GRANTSPERSONSHIP

Upon completion of this workshop, the student should:

1) know the difference between a grant and a contract
2) know the difference between various types of grant mechanisms, such as block grants, categorical grants, project or program grants, and revenue sharing
3) be able to describe theory underlying the grant mechanisms listed above
4) be able to describe at least one theory underlying philanthropic and governmental grant programs
5) be able to describe a relationship between tax policy and grant mechanisms
6) know how to access and utilize at least five sources of information on availability of funds, including
   a) Commerce Business Daily
   b) Federal Register
   c) Catalogue of Federal Domestic Assistance
   d) Foundation Directory
   e) newsletters and publications of professional and trade organizations
7) be able to design criteria for resources allocation, that is to assume a role in a funding agency with responsibility for effective distribution of limited funds
8) describe administrative procedures designed to position an agency or organization to take advantage of funding opportunities which may arise

9) be able to write a proposal to seek funding for a new service, training or research project or program with an initial annual budget of at least $100,000, targeted to a specific funding source. The proposal should include at least the following:

   a) a statement of the problem, describing background and need for action
   b) a statement of measurable objectives
   c) proposed action to achieve objectives, including consumer participation
   d) a management plan
   e) a plan for evaluation
   f) budget: resources needed, job descriptions, etc.
   g) relationships with other agencies or organizations
   h) a plan for continuation of the project after initial seed monies are no longer available
   i) a plan for sharing of project findings with other practitioners and researchers

LABOR MANAGEMENT CONTRACT NEGOTIATIONS IN THE PUBLIC SECTOR

Collective bargaining is increasingly prevalent in the non-profit sector. Many agencies without experience in this area are finding themselves conducting collective contract negotiations. Dr. Howard Leftwich, of the University of Cincinnati Department of Economics, will present a broad overview of the procedures leading up to, and concluding with, a successfully negotiated, mutually satisfactory contract. The workshop will not be a substitute for professional consultation, but rather will acquaint the audience with the general process, and the legislative background. Dr. Leftwich is the content expert for "Labor Management Relations in the Health Care Industry", an existing Learning Resource Unit. Response to that Learning Resource Unit indicates that there is a broad and general need for program content on this area. All non-profit agency management and personnel will benefit from a general introduction to the collective bargaining process.

INTERVIEWING WORKSHOP

In order to effectively respond to the needs of their communities, agencies increasingly must design and conduct studies to verify and validate assumptions about the attitudes or characteristics of target populations. Interview techniques, properly employed, can provide a legitimate tool for such endeavors. Improperly utilized, these methods have vast disruptive potential. The workshop will focus on the mechanics and theory of the three basic interview approaches. The information will be presented in a fashion to aid participants in deciding which procedure is most appropriate to a given data collection requirement. The role of the interviewer will also be analyzed and basic skills discussed. The workshop will be conducted by Mr. Harry Kerst of the Program faculty. Mr. Kerst

has trained interviewers for the City of Cincinnati, the Citizens Committee on Youth, and designed interview studies for the Cincinnati Community Chest, the Florida State Department of Corrections, and is the author of "Applicability of Interview Training Techniques in a Population of the Inner City Unemployed". If student interest is expressed, follow-up workshops will be presented on instrument design, pilot studies, sampling methods, and specific field strategies.

BOARD TRAINING

Agencies which receive any form of Federal support are almost universally mandated to maintain consumer representation at the board level. Effective board-staff relationships depend on an understanding of the complimentary nature of their roles. Too often, the board plays no useful role in agency decision-making, serving as a rubber stamp for staff recommendations, thus defeating the purposes for which it is mandated. In other situations, board and staff are locked in a non-productive adversary relationship. The workshop series will be coordinated by Annie K. Phillips, M.P.H., Education and Training Director for the National Association of Community Health Centers. She will be aided by resources from the University of Cincinnati. The workshop will focus on the role of the board in effective agency operations, the importance of board understanding of the agency's mission, and lines of communication betwen staff, board and the community at large.

APPALACHIAN CULTURE

Appalachian migration to urban areas necessitates an understanding on the part of social and health agency personnel of the unique aspects of Appalachian culture. This workshop will present an analysis of the basic Appalachian cultural institutions, and their history and role in the lives of Appalachians. While the practical utility of an understanding of Appalachian culture has greatest saliance in the eastern half of the United States, the more general paradigm of rural to urban and cross cultural integration is of interest to all service providers. The workshop will be coordinated by Dr. Thomas E. Wagner, Assistant Senior Vice-President of the University of Cincinnati. Dr. Wagner is Project Co-Director of the Ohio Urban Appalachian Awareness Project, and has successfully conducted workshops on this theme for local police departments, the National Association of Social Workers, mental health centers, the United Way as well as local civic, educational and religious organizations.

Sites

The program product (educational deliverables) which have been described will be made available at our initial set of thirteen sites (U.C. base plus twelve carefully selected, geographically scattered locations). The site selection process

is detailed in Section Two, "User Needs and Identification". The following areas represent the cities and facilities which meet all criteria in terms of needs assessment, physical facility readiness, and full cooperative status. Documentation for site cooperation is contained in Appendix A. The sites, in alphabetical order are:

ALABAMA, EUTAW.....Black Belt Community Health Center at Eutaw
P.O. Box 95
Epes, Alabama 35460

ARKANSAS, MARIANNA.....Lee County Cooperative Clinic
530 West Atkins Boulevard
Marianna, Arkansas 72360

DISTRICT OF COLUMBIA.....Community Group Health Foundation, Inc.
3020 14th Street, N.W..
Washington, D.C. 20010

GEORGIA, SAVANNAH.....Westside Comprehensive Health Center
2 Roberts Street
P.O. Box 2024
Savannah, Georgia 31402

MASSACHUSETTS, ROXBURY.....Massachusetts League of Community Health Centers
55 Dimock Street
Roxbury, Massachusetts 02119

MISSISSIPPI, JACKSON.....Jackson-Hinds Comprehensive Health Center
P.O. Box 3437
Jackson, Mississippi 39203

NEW MEXICO, SANTA FE.....Resources for Community Alternatives
Post Office Box 5434
Santa Fe, New Mexico 87501

OHIO, CINCINNATI.....Program in Community Health Planning/Administration
College of Community Services
Room 321 French Hall
Location #128
University of Cincinnati
Cincinnati, Ohio 45221

OHIO, TIFFIN.....San-Valley Recovery Residence
99 East Perry Street
Tiffin, Ohio 44883

OKLAHOMA, TULSA.....North Tulsa Ambulatory Care System
1520 N. Hartford
Tulsa, Oklahoma 74106

SOUTH CAROLINA, RIDGELAND..Beaufort-Jasper Comprehensive Health Service
P.O. Box 357
Ridgeland, South Carolina 29936

TENNESSEE, NASHVILLE.....Department of Public Health
Cordell Hull Building
Nashville, Tennessee 37219

TEXAS, SAN ANTONIO.....Rio Grande Federation of Health Centers
830 N.E. Loop 410
San Antonio, Texas 78209

These sites reflect a broad range of settings and as wide a geogrphic distribution as is possible within the guidelines of our site selection criteria. Additional sites have been surveyed and are being held on reserve for both possible substitution and expansion. We feel that the thirteen site configuration is large enough to provide a full demonstration of the system's capacity and provide a firm foundation for self sustaining growth.

The relationship between numbers of sites and necessary support personnel has been thought through and, to the extent that it is possible, the lessons learned in our present delivery mode were applied.

Translating our known staff to student requirements into the proposed satellite delivery system yielded a formula which generates support requirements as follows:

A) each group of 45 to 60 learner/users requires a content specialist with secretarial backup.

B) each group of 90 to 120 learners requires a "cluster manager" who deals primarily with the University/ student interface.

C) each site will require two personnel which are not currently utilized by our program.

1) a site logistics liason person will be concerned with on-site technical matters and equipment functioning and readiness.
2) an on-site student/user representative who will deal with site specific program and content concerns as well as the record keeping and liason duties which were spelled out in the previous section. This role is seen as the functional equivalent of the on-campus "graduate assistant."

The on-site student/user representatives will have automatic membership on the User Advisory Committee. We propose that these representatives be active students and that they be selected by

their peers. The program will award a tuition scholarship to the representative selected by each site group in return for the performance of the duties outlined above

At the University level, the program will maintain a liaison with the University Media Center through a media specialist. The media specialist will report to the Technical Manager and be concerned with all on-going technical production particularly as it impacts courseware conversion and workshop development. The media specialist function is not tied to the support to student ratio formula as are the other Level III support services.

The incremental growth of the system is modular in nature and based upon the three site unit of 45-60 students. The proposed network can thus be seen as Cincinnati base plus four 3 site modules. These figures are based upon the reality of our past experience and analysis of staff and faculty support necessary for external students.

Technical System Requirements

Our investigation of available satellite options leads us to conclude that the most sensible entry point into the technology is that which represents the lowest immediate capitalization and operating cost. To this end, technical compromises may be made as long as there is no degradation of the capability to operate in the interactive mode, which we believe to be vital to the process of graduate education and professional socialization.

It has been shown, moreover, that narrow-band applications represent the most prudent and cost-effective use of available spectrum space for interactive educational purposes. Given this, ATS-3 (or an as yet undetermined equivalent commercial or experimental service) is the satellite of choice for our educational experiment. It has the capability for fully interactive operation, at extremely low capital expense. All of our proposed sites are within its footprint, which covers the entire Continental United States which allows for system expansion. Of all available NASA experimental communications satellites, it and its older twin ATS-1 show the best prospect for continued longevity of service. Should the spacecraft fail, all ground equipment would be fully compatible with ATS-1 operation. It should be noted that, in this eventuality some East Coast coverage would be lost and some network reconfiguration would be necessary.

The full technical configuration for each ground station (using ATS-3) will consist of:

Transciever.....linear amplifier
power supply
antennas (modified)

Slow Scan Unit.....B & W camera
monitor
black box
audio tape recorder
spare parts

Facsimile device (rental)

We feel that this narrow band installation will provide the interactive component (which we believe in) and deliver the unique benefits of satellite communications for our educational mission in the most cost-effective manner possible.

Qualifications

The University of Cincinnati Program in Community Health Planning/Administration is uniquely qualified to undertake this project, for a number of reasons. It:

1) offers the largest external degree program in health planning/administration in the United States. Some 200 students in several states will be enrolled in the Autumn Quarter, 1977.

2) has experience in developing software for use by non-residential students, and has software which can be adapted for use with new communications technology.

3) has experience in adapting University administrative and support systems to meet needs of non-residential students.

4) has experience in developing new sources of funding, e.g., training contracts with the Ohio and Tennessee state departments of health, and generating income to make a new program self-sustaining when seed money is no longer available.

5) has experience in successfully planning and implementing a major innovation in non-traditional education within a large university.

The external M.S. program has been developed with the aid of a four-year contract, from July 1, 1974 through June 30, 1978, with the Bureau of Health Manpower, Health Resources Administration, DHEW. The contract number is NO1-MB-44178. Contract officer is Mr. William Holland, 3700 East-West Highway, Hyattsville, Maryland 20782; telephone 301/436-6815. Of the bidders who responded to the external degree RFP in 1974, the University of Cincinnati was the only one selected for funding.

Four years of experience with the external degree program and assessment of its potential suggests exciting possibilities for impact on the nation's health and medical services system which traditional university programs do not and perhaps cannot have.

Traditional residential graduate programs in health planning, hospital and health administration enroll a somewhat haphazard, small group of students: individuals seeking the education and the credentials to enter the field, and individuals on leave from jobs in the field to acquire the education and credentials needed to further their careers and their effectiveness. Upon graduation, they tend to scatter to a variety of agencies and facilities, and to a variety of communities. They join the few health administrators in the United States estimated to hold a master's degree in health planning/administration.

They are few, they are isolated, and their impact is diluted. Their ability to combine and cooperate to form a critical mass which might bring about desired change in the health and medical services system is limited.

The University of Cincinnati external degree program, on the other hand, offers unusual possibilities for impact. For example:

1) we have the potential to enroll the entire professional staff of an agency or facility.

2) we have the potential to enroll a significant number of health and medical services system personnel in a specific community or geographic area.

3) we have the potential to enroll board members as well as staff.

4) we have the potential to enroll patients or consumers of health services in non-credit education.

5) we have the potential to enroll a significant number of persons who may be scattered geographically, but who share common interests and deal with common problems, for example, in administration of Health Systems Agencies, or Health Maintenance Organizations, or extended care facilities, or Professional Service Review Organizations, or rural health services, or inner city health services. We can provide communications links to help form networks of people who share problems and solutions.

6) we have the potential to enroll a mix of health professionals in a community, such as physicians, nurses, hospital administrators, health educators, and others, and promote institutional interaction and inter-disciplinary cooperation.

7) we have the potential to enroll women, members of minority groups, and personnel of small or isolated agencies and facilities who might not otherwise be able to leave their communities and their jobs in order to enroll in a university, and whom ight thus be able to introduce new perspectives into policy on health and medical services in their communities.

8) we have the potential to enroll a significant number of members of specific professional and trade organizations in the health and medical services industry.

9) we have the potential to enroll large numbers of students in learning programs which are individualized, yet probably no more costly than traditional curricula.

10) we have the potential for offering a large scale, non-residential continuing education program to serve persons and agencies not interested in a degree program.

11) we have the potential for developing an external baccalaureate program to meet needs of health personnel at that level, and to establish a career ladder of education.

In a sense, the University of Cincinnati program, because of its conceptualization, its design, its software, its goals, and its accomplishments, is a program which is awaiting the advent of appropriate communications technology to enable it to achieve its full potential.

The organizational arrangements necessary to implement the satellite delivery system plan will build upon, and be complementary to, the existing Program and University management structure. The key to a smooth transition lies in the creation of new, specialized management entities and their integration into the existing system, to manage advanced telecommunications forms and accompanying Program expansion. An important part of this transition will be provided through the experience gained in the operation and management of a three site prototypical network using ATS-1 and ATS-3,(ProtoNet) This opportunity has been provided through small "hardware only" grant from the Rubin Foundation of New York, New York which will fund three audio interactive ground stations. This mini network provides the nucleus and initial point upon which this NIE proposal is based.

The ability to experience the realities of an existing interactive education delivery system serving geographically dispersed students, plus the realistic anticipation has provided valuable input to decisions concerning what would and would not be appropriate personnel, policies and programming to maximize the impact of the new technology.

The ProtoNet has been designed to anticipate the ground station configurations and organizational requirements of the proposed full net, on a small scale so that program and technical personnel can gain experience and assume broader responsibilities as the net grows.

The formative and summative evaluation generated through ProtoNet experience will be utilized in the ongoing management plan for the full network. In point of fact, summative evaluation data from the ProtoNet will play a formative role in the full net evaluation loop. Our plan calls for the merging of the two systems; thus the ProtoNet system serves as sites one, two and three of the full net. The organizational chart which has been developed (Figure 1) as well as the project framework

(Figure 2) reflects the inputs generated by the three site ProtoNet which precedes the implementation of the full network. the organizational scheme will be presented through a detailed description of each management level in terms of its role, function and staffing. Particular emphasis is placed on a careful mapping of the interfaces as they affect information flow and organizational objectives.

Level I, top management, policy level is centered upon the Project Director who bears ultimate responsibility (fiduciary and programmatic) for the success of the project and accomplishment of the expected results. The Executive Advisory Committee is also a Level I entity and relates laterally to the Project Director. The committee is small, with policy level representation from each of the three principle project participants: University of Cincinnati (UC), the National Association of Neighborhood Health Centers (NACHC), and the Public Interest Satellite Association (PISA). At Level I, decisions with potential to affect overall program impact are either originated or reviewed by the Project Director, with consultation from the Executive Advisory Committee. The Project Director is also responsible for consulting with appropriate University officials as needed. Project goal and objective setting activities will provide a major interface with Level II through the communication channels between the Project Director and the Division Area Managers. This will insure that contradictions, if any, between Division targets do not emerge as detrimental to overall Program expected results.

The Senior Vice President and Provost's Advisory committee has been established during our planning process and also is a Level I entity. This body is specifically charged with providing a multi-disciplinary input into the satellite system development process. It is a University-wide committee with members drawn from the Dean and Department Chairperson levels, and representing a wide variety of academic disciplines. Such cooperative University users of the system as the Behavioral Sciences Laboratory, the Public Administration Program and the Library input at Level 1 through the Provost's Advisory Committee and at Level II laterally to the Division Managers. The Project Director will communicate directly with this Advisory Committe, and the Committee will make recommendations for new uses of the system to the Project Director and to the Senior Vice President and Provost.

The Executive Advisory Committee and the Senior Vice President and Provost's Advisory Committee interface through the Project Director. The organizational chart (Figure 1) reflects both the ProtoNet and full net organizational schema. The solid line indicates ProtoNet entities and relationships. The broken lines represent full net organizational elements

not yet in place at the ProtoNet stage of operation, but to be added as the net grows. Supporting Level I efforts is the Administrative Assistant, who is directly responsible to the Project Director. The Administrative Assistant will aid the Project Director, principally in the area of financial management and record keeping. Additionally, clerical support staff for both Level I and Level II activities will be organized and supervised by the Administrative Assistant.

Level II decisions and responsibilities are dealt with by the Division Managers. Division targeting (sub-program goal and objective setting) is an interfacing function between Level II and Level I. The mutual support and overall contribution toward project expected results of and by Division targeting is assured by the Level I overview.

The Division Managers interface with Level I, as well as laterally at Level II.

Central to ProtoNet Level II operations are the Technical Division Manager and the Program Division Manager. A direct line connection between these roles insures that:

A) as new program content is developed, the appropriate technical capacities of the delivery system are utilized, and

B) program content applications do not exceed available technical capabilities

For these reasons, production is seen as a joint responsibility for the Program and Technical Division Managers. This is a departure from the usual model where the Technical Division Manager serves as the interface between programming and production. This conventional plan, we believe, entails an innate bias toward technology-driven production. Our experience in the successful development of mediated learning materials has taught us that the direct and co-equal responsibility-sharing in the area of production by technical and program-oriented personnel provides a greater level of assurance that user-driven, and useful materials will be developed.

The Technical Division Manager, in addition to involvement in production is responsible for supervision of all technical aspects of the delivery system. The Technical Division Manager interfaces at Level III through the Cluster Managers to the Site Logistics Liaison at each site. The Technical Division Manager is also responsible for the ongoing analysis of available technology which will input the decision of appropriate time and path to commercial cutover. The Public Interest Satellite Association, and other consulting engineers as needed will input the Technical Division Manager as appropriate.

The Program Division Manager, in addition to the previously outlined production role, has Level II responsibility for the educational product (deliverables) including both degree-based and certificate offerings. The Program Division Manager maintains direct liaison with other University departmental users, and it is through the Program Division Manager that they interface with the technical area. The Program Division Manager's organizational relationship to Level III is through the Cluster Managers to the on-site student/user representatives. The Program Division Manager's responsibilities include effecting changes mandated in Program materials through formative and summative evaluation. The Program Division Manager works with faculty content experts and the Technical Division Manager in the development of new Learning Resource Units.

The Field Liaison and Special Projects Coordinator is responsible for full liaison with the local management of health centers where the ground equipment is located. This includes necessary local space and facility arrangements, and the coordination, with the local health center management, of the selection of the Site Logistics Liaison, a site-specific Level III part-time position. The Field Liaison and Special Projects Coordinator will also be responsible for ongoing user need studies and the location and analysis of new sites for expansion. The F.L.S.P.C. will also identify new content areas, based on user needs. These will include programming aimed at the specific needs of community health centers, as well as development of consumer education material. These will be coordinated laterally at Level II with the Technical Division Manager and the Program Division Manager. This Coordinator will also be responsible for formative evaluation, which will input the system where appropriate.

With full net implementation the tasks of information and materials distribution to the sites, as well as general public information disemination will become increasingly important to system operations. Along with this, increased coordination of the receipt of materials from the sites will be needed. These functions are vital to the effective achievement of the expected results, and thus are included at Level II in the position of the Site Coordinator. The Site Coordinator relates laterally to all other Level II divisions, providing a centralized resource for the disemination and processing of information. This will also insure certain economies and prevent overlap in the design and retrieval of data collection instruments.

The Director of Research and Evaluation (DRE) will have responsibility for the overall assessment of the project. In addition to summative evaluation of all project programs and departments, the Director of Research and Evaluation will assess the overall effect of the project. The monitoring of levels of effort and the results produced will be the responsibility of the DRE. New research applications and projects

suggested by other system users will also be reviewed by the DRE in terms of their applicability to project expected results. The role of the DRE is central the process of Division Targeting. All division targets must be objectively verifiable, and the DRE will have major responsibility for such verification. The DRE will entertain all proposals for research projects concerning applications of the net and will execute periodic assessments of network impact on target student/users and their communities.

Each group of three clusters will be assigned to a Cluster Manager. The cluster manager is a Level III position combining the functions of student ombudsman and advisor. We have found through experience with our existing program that it is necessary for each student to have an "inside" person on the main campus who can advise on course selection, as well as aid the student in a number of areas that are unique to the external student. Whereas. the on-campus student can easily verify records with the Registrar, correct billing errors and deal with a host of possible beaurocratic snafus, the off-campus student is at a considerable disadvantage in these areas.

It is the job of the cluster manager to be the student's advocate within the university system, and to locate the inevitable system breakdowns and remedy them. The cluster manager is familiar with university policies and procedures, and with the adjustments which are possible and necessary to accommodate the needs of the non-residential learner. The cluster manager has direct access to Level III personnel, as well as to faculty content specialists.

At the local site-specific level, two, part-time, Level III personnel are included in the organizational plan: the site logistics liaison and the student/user representative (SUR).

The logistics liaison is an individual in the employ of the local agency housing the satellite ground equipment who has been assigned responsibility for the technical operation of the ground equipment. This person will be trained by the Technical Manager at the time of equipment installation. The site logistics liaison must be present at the site whenever the equipment is scheduled for use. The functions of the site logistics liaison will require very little technical expertise, essentially entailing the switching on and off of the equipment. The site logistics liaison will also be responsible for assuring that the building is open and available for scheduled transmission. Since these functions involve interface with the agency which houses the ground station in areas such as building security, the site logistics liaison must have every access to the facilities. This person will be a member of the agency staff assigned by the agency management, with consultation from the Field Liaison and Special Projects Coordinator. The duties will not be exceptionally burdensome or time-consuming.

site logistics liaison will perform no technical maintenance functions, rather he will be trained in the recognition of technical difficulties which should be referred to the Technical Manager for appropriate action.

The other site-specific part-time Level III position is that of the student/user representative. Students at each site will elect a student/user representative. The student/user representative will have certain specific programmatic responsibilities which are described in the Operational Plan Section of this report. The SUR is compensated for additional duties through a graduate scholarship. In addition to programmatic responsibilities, the SUR is a member of the User Advisory Committee, a representative body with Level I policy input. This is to insure that the student/user perspective on the ultimate program deliverables (educational product) has impact on project policy. Such representation of student interests is vital to insure the ultimate success of the project.

The overall project organization is designed to insure co-lateral consultation at Level II - the critical level of operational management. At the same time individual divisions have clearly delegated areas of responsibility. The concept of negotiated division targets, a mutual Level I, Level II concern, asures that divisions will work productively toward the Project Expected Results. Student/user (Level III) representation at Level I will provide a necessary "reality perspective". The proposed organizational plan will encourage both accountability and mutual support toward the ultimate end of achieving the project goal.

KEY EVENTS AND ACTIVITIES

The events and activities necessary for the achievement of the project objectives are detailed in Fugure 3, the PerfNet. The PerfNet details the relationship between events and activities in a time-based, linear design. Because there have been several activities and events during the latter period of the planning effort (Phase I), which impact the evaluation and deployment of the proposed network, and because the ProtoNet represents the first step in its development, the presentation of key events and activities commences with the present time. The events above the centerline of the PerfNet refer to the "N.I.E. Activities Track" while those below the centerline refer to ProtoNet activities. The ultimate outcome is total merger (as ProtoNet activities are, in reality, inputs to the project objective).

The narrative which follows will provide a month-by-month account of the input of key events and activities to the program objective.

MARCH, 1978

March was focused around the AESP experimental program and its evaluation. The program was successful and negotiations with the AESP concerning a formal relationship are scheduled.

KEY EVENT.....AESP DEMO PROGRAM AND EVALUATION

APRIL, 1978

Technical activities in April are centered around the NASA proposal and the receipt of the Rubin Foundation funds for the PtotoNet. Programatically, the chances are directed to student recruitment and the cooperation with other University departments.

KEY EVENTS.....VENDOR SELECTED FOR PROTO-HARDWARE
.....NASA PROPOSAL SUBMITTED
.....STUDENT APPLICATIONS DISTRIBUTED
.....BEHAVIORAL SCIENCES LAB AND INSTITUTE FOR GOVERNMENTAL RESEARCH SUBMIT PLANS FOR SYSTEM USE
.....AESP COOPERATION MEETING

MAY, 1978

May's activities for the technical staff deals with the field work necessary to complete the FCC licensing applications. The Program staff will deal with the processing of student applications and the preparation of documentation for those states which require certification through their boards of Higher Education. The User Committee's initial members will be selected by the students at each site.

KEY EVENTS.....F.C.C. LICENSE APPLICATIONS FILED
.....ADMISSIONS COMMITTEE ACTS
.....USER COMMITTEE FORMED

JUNE, 1978

The program division will begin to design the protocols and software for network use and convene the user committee for mutual information sharing. The formative and summative evaluators will be selected this month and the Technical Staff will specify the precise duties of the technical site liaison personnel.

KEY EVENTS.....APPROVAL BY STATE BOARDS OF HIGHER EDUCATION RECEIVED
.....USER COMMITTEE MEETS
.....FORMATIVE AND SUMMATIVE EVALUATORS SELECTED

JULY, 1978

The central event in July is the receipt of NIE funding approval. Upon this notification the technical division will finalize the full network design and order hardware. This division will also write the operational manuals for use by site liaison persons. FCC approval of the ProtoNet sites is also expected this month and additional applications will have to be filed for the balance of the full network sites. The program division group will begin the recruitment of the

new content faculty and conduct a workshop for existing faculty. (This will set up an "each-one, teach-one" situation when new faculty come on board.) Program division will initiate the design of the management information system and develop cost-sharing formuli for use with other network users. The first public information dissemination will commence this month and the last week will be devoted to new-student orientations.

KEY EVENTS.....NIE FUNDING APPROVAL
.....FCC APPROVAL (Sites 1-3)
.....EQUIPMENT ORDERED FOR PROTO-NET
.....OPERATING MANUALS COMPLETED
.....FACULTY RECRUITMENT (Full Net)
.....FACULTY TRAINING WORKSHOP FOR EXISTING STAFF
.....MANAGEMENT INFORMATION SYSTEM AND COST-SHARING FORMULI DESIGNED
.....STUDENT ORIENTATION AT U.C.
.....INTENSIVE SUMMER SESSION (Optional)

AUGUST, 1978

The technical division will apply for a NASA modification agreement to accommodate the NIE funded sites. They will be installing and testing equipment on the initial sites and training site liaison staff with the operations manuals. Program division will be concerned with finalizing courseware and adoption of slow-scan materials as appropriate.

KEY EVENTS.....APPLY FOR NASA APPROVAL (full Net)
.....INSTALL AND TEST GROUND EQUIPMENT (ProtoNet)
.....OPERATING MANUALS DISTRIBUTED AND SITE LIAISON TRAINING BEGUN
.....FINALIZE FALL COURSEWARE

SEPTEMBER, 1978

Technical division will be bringing the full net on line and testing equipment as soon as NASA approval is received this month. The ProtoNet is activated for student use and the study of new sites is carried on this month and the full net FCC license applications are filed. The Program division will be hiring and training Level III personnel this month in preparation for opening ceremonies (Savannah site). The executive committee will hold their meeting as a teleconference at the end of the month.

KEY EVENTS.....NASA APPROVAL AND FCC APPLICATION FOR FULL NET
.....INSTALL AND TEST EQUIPMENT
.....PROTONET ACTIVATED
.....FULL NET PERSONNEL HIRED
.....OPENING CEREMONIES (PROTONET)
.....EXECUTIVE COMMITTEE MEETS ON NET

OCTOBER, 1978

Technical division will be conducting an evaluation of last months equipment tests and will make modifications if necessary. This is a catch-up month in many ways for Technical Division. The Program divisions will product the first formative evaluation report and will be planning and formating the Washington decision-maker interactive program (this is to be a bi-monthly feature).

KEY EVENTS.... ....EVALUATION OF EQUIPMENT TESTS COMPLETED
.....FORMATIVE EVALUATION REPORT PRESENTED
.....WASHINGTON DECISION-MAKER PROGRAM AIRED

NOVEMBER, 1978

FCC approval for the full net sites will be received this month and technical division will complete all modifications required. Program division will analyze the effectiveness of the courseware in use and Proto-Net and continue to develop slow-scan elements to enhance delivery.

KEY EVENTS.....FCC APPROVAL FOR FULL NET RECEIVED
.....ALL TECHNICAL MODIFICATIONS COMPLETE
.....COURSEWARE ANALYZED FOR EFFECTIVENESS

DECEMBER, 1978

Technical division completes all test and modifications and moves to a maintenance mode. The Technical Director will now assemble the data collected, and move to a high priority analysis of commercial cutover. Program division will receive the summative evaluation and make courseware modifications as appropriate. The first Student Performance Evaluations produced by students using the net are due this month and will be compared to those produced by students who remain in the original external group. The Advisory Committee will meet this month and produce the year-end report.

KEY EVENTS.....FULL NET UP AND RUNNING
.....ALL TECHNICAL AND PROGRAM PERSONNEL IN PLACE
.....YEAR END REPORT BY ADVISORY COMMITTEE

The perfnet carries the project to full operational status and clearly defines the areas of responsibility for the activities and events which are critical to the accomplishment of the project objective....."Create a system of development and delivery for graduate and continuing education to serve student/users who would not otherwise have such an opportunity."